

APPENDIX B

Economic Analysis

The Model

Economic effects to local counties were estimated using an economic input-output model developed with IMPLAN Professional 2.0 (IMPLAN). IMPLAN is a software package for personal computers that uses the latest national input-output tables from the Bureau of Economic Analysis, secondary economic data at the county level from a variety of public sources, and proprietary procedures to develop an input-output model for a study area. The process and software were originally developed by the USDA-Forest Service and are now the property of the Minnesota IMPLAN Group (MIG, Inc.). All IMPLAN models were developed using 1998 data. These were the most recent data available at the time of model development.

The Curlew National Grassland model includes Oneida County within which the entire grassland is located. This does not represent the functioning economy of the region as people in Oneida County travel outside county boundaries to do much of their shopping and business transactions. For the purposes of estimating local impacts due to changes in management of the Grassland, it was decided to limit the study area to Oneida County. In the Oneida model, only people coming from outside the county area were considered non-residents. Non-resident spending activity is considered an export of local resources and is counted as economic impact while local spending is considered a contribution to the economy, but not an increase of total spending to the area.

Economic Environment

The description of the economic environment examines the contribution that grassland related activities make to industry output and employment within the analysis area. Specific IMPLAN sectors were selected as a proxy, or representation of the grassland resource-related industries of interest in Grassland planning. Table B-1 illustrates the sectors selected, grouped by the grassland resource-related industries they represent.

Table B-1. Sector Aggregation Used Separate Forest Related Industries

Sector	Forest Resource-Related Industry
Recreation and Tourism Support	
454	Eating And Drinking
463	Hotel And Lodging
477	Automotive Renting and Leasing
488	Amusement and Recreation Services
Grazing	
004	Cattle grazing

The results of the contribution analysis are an estimate of employment and income related to Curlew National Grassland resources. The analysis illustrates the relative importance of Grassland activity within the analysis area.

Economic Impact Analysis

Economic impact analysis describes what happens when a change in final sales (e.g. exports and consumer purchases) occurs for goods and services in the analysis area. Changes in final sales are the result of multiplying units of production (e.g., head months available or recreation visitor days (RVDs) of recreation use) multiplied by fees per unit. Economic impacts were estimated using the best available production and sales data. The source of each are listed below.

Impacts to local economies are measured in two ways: employment and labor income. Employment is expressed in jobs. A job can be seasonal or year-round, full-time or part-time. The number of jobs is computed by averaging monthly employment data from state sources over one year. The income measure used was labor income expressed in 2000 dollars. Labor income includes both employee compensation (pay plus benefits) and proprietors' income (e.g. profits by self-employed).

The analysis area model was used to determine the employment and income consequences throughout the economy of one-million-dollar changes for each kind of resource impact. The results are called response coefficients. Because input-output models are linear, multipliers or response coefficients need only be calculated once per model and then applied to the direct change in output. Spreadsheets were used to calculate total effects by multiplying the response coefficients by estimated levels of dollar activity. A customized Excel workbook called FEAST (Forest Economic Analysis Spreadsheet Tool) was developed and used for this purpose. Details of FEAST may be examined in the project record. Specifications for developing response coefficients and levels of dollar activity are stated below.

Recreation and Tourism

Expenditure Data. Visitors to the National Grassland in Idaho often engage in a variety of activities during a trip. Six recreation categories were considered for the FEIS to compare between alternatives. Expenditure data was obtained from Public Area Recreation Visitor Surveys (PARVS) conducted from 1985 through 1987 and combined with data from approximately 5,100 customer surveys conducted on 55 Forest Service Ranger Districts from 1988 to 1996. These recreation expenditure profiles were incorporated into the model for the recreation categories.

Recreation use numbers were based on discussions and consensus among the Recreation Specialists from the Ranger Districts and Supervisor's office. It was assumed that the percentage of use by non residents was limited as the majority of use is by local people (See Project File).

The PARVS expenditure profiles were adjusted to use Regional Purchase Coefficients (RPCs) to estimate the amount of local spending in both rural and urban models. PARVS resident data reflects expenditures by persons within a 50-mile radius of the analysis area. Non-resident data reflects expenditures by persons traveling to the analysis area from more than 50 miles away. All PARVS expenditure profiles were normalized to allow for response coefficients calculations. For specific expenditure information, please refer to the FEAST and IMPLAN outputs available in the planning record.

The unit of measure used to estimate recreation use was Recreation Visitor Days (RVD). One RVD is equal to 12 hours of a given activity for one person. However, most people do not participate in one recreation activity for a full twelve-hour day. Since the PARVS expenditure data is expressed in dollars per person per day/visit, it was necessary to convert the RVD data into the equivalent number of visits in order to more accurately estimate visitor expenditures. The assumptions used for the conversion of RVDs to visits are detailed in Table B-2.

Table B-2. RVD Conversion Factors—Recreation

Activity Category	Average Duration of Activity per Visit	RVD Conversion Factor
Camping, picnicking, swimming	3.63 hours	3.31
Mechanized travel and viewing	2.63 hours	4.56
Hiking, horseback riding and water sports	4.17 hours	2.88
Other recreation	3.00 hours	4.00

Source: USDA Forest Service, 1981.

The ‘Camping, Picnicking, & Swimming’ category includes all camping and picnicking activities. ‘Mechanized Travel & Viewing’ includes all biking, snow machines, OHV use, driving for pleasure and scenic viewing activity. ‘Hiking, Horseback Riding & Water Travel’ includes all hiking, water sports, motor boating, mountain climbing, and horseback riding occurring on the Forest. All other types of recreation are included in the ‘Other recreation’ category.

Use of the Model. One million dollars of expenditures for the categories of recreation discussed above were input into the IMPLAN model. The results were then incorporated into the FEAST workbook where they were multiplied by total expenditures for each recreation category. Only non-local recreation expenditures (tourism export) use was considered in the impact analysis.

Fish and Wildlife

Expenditure Data. The U.S. Fish & Wildlife Service (USFWS) periodically conducts a national survey to obtain, among other information, data on expenditures for hunting, fishing, and other wildlife-related recreation. This information is available by state. The Forest Service Inventory and Monitoring Institute organized these expenditures profiles for use in IMPLAN. Expenditures were collected on a “per trip” basis, but converted to a person-day basis for use in IMPLAN. Expenditure profiles for resident expenditures in Idaho were used for estimating impacts from wildlife-related recreation.

The USFWS expenditure profiles were adjusted to use RPCs to reflect local spending in the IMPLAN model. As with the recreation expenditure profiles, resident data reflects expenditures by persons within a 50-mile radius of the analysis area and non-residents are from outside the 50-mile radius. All USFWS expenditure profiles were normalized to allow for response coefficients calculations.

Use data for general hunting, general fishing and non-consumptive wildlife use are based on 1996 RIM numbers and adjusted through discussion and consensus among the Recreation

Specialists from the Ranger Districts and Supervisor's office. It was assumed that the percentage of use by non residents was limited as the majority of use is by local people (See Project File).

To use the USFWS per visit expenditure profiles, the use units had to be converted into visits. The conversion factors used are highlighted in Table B-3.

Table B-3. RVD Conversion Factors—Wildlife and Fish

Activity Category	Average Duration of Activity per Day	RVD Conversion Factor
General hunting	7.1 hours	1.69
General fishing	4.3 hours	2.79
Non consumptive wildlife	3.0 hours	4.00

Source: U.S.D.A Forest Service, 1981.

Use of the Model. One million dollars of expenditures for the three categories of fish and wildlife discussed above were input into the IMPLAN model. The results were then incorporated into the FEAST workbook where they were multiplied by total expenditures for each category. Only non-local recreation expenditures (tourism export) use is considered in the impact analysis.

Grazing

Marketing and inventory data was obtained from the Agriculture Census. The State's total marketing income for cattle and sheep was divided by the total inventories for the same in order to develop an estimated value per animal and then a value per head month (HM). Forest grazing use was estimated based on the number of HMs currently permitted. Through the FEAST workbook, this data was multiplied by the value determined above to calculate the value of the grazing that occurs on the Forest.

One million dollars of exports were input into the IMPLAN model through the range fed cattle and sheep, lambs, and goat sectors to determine RPCs. These RPCs were then applied to the value of the livestock grazed on the National Forest to estimate the total economic impact. Details of distribution estimates are available in FEAST, which is located in the project record.

Federal Expenditures & Employment

Expenditure Data. The Forest applied budget constraints to every alternative. This budget constraint was used to estimate total Forest expenditures, some of which had local economic effects. Total Forest obligations by budget object code were obtained for actual expenditures in 1996 from the National Finance Center. This data was used to estimate how the budget would be spent between programs. Details regarding the expenditures may be found in the project record. Forest Service employment was estimated by Forest staff based on current organizational charts and projections of future staffing levels based on expected workloads and budgets (See Project File).

Use of the Model. To obtain an estimate of total impacts from Forest Service spending, salary and non-salary portions of the impact were handled separately. Non-salary expenditures were determined by using the budget object code information noted above. This profile was input into the IMPLAN model for non-salary expenditures for one million dollar expenditure, and the results multiplied by total Forest non-salary expenditures. Sales to the Federal Government are treated in the same manner as exports, money coming from outside the model area.

Salary impacts result from Forest employees spending a portion of their salaries locally. IMPLAN includes a profile of personal consumption expenditures for several income categories; the average compensation for an employee on the Curlew National Grassland fell in the category of \$40,000-\$49,999. Across the U.S., Americans typically spend about 67% of their total salary plus benefits. Therefore, total Forest Service salaries were multiplied by 0.67 before being multiplied by the one million dollar response coefficient.

Revenue Sharing -- 25% Fund Payments

Expenditure Data. Historically, Federal law has required that 25 percent of current or historical revenues be returned to the States and Counties within which the revenues were received. These payments may be used for a variety of purposes, including schools and roads. The *Secure Rural Schools and Community Self-Determination Act of 2000* provides a new formula for computing annual payments is based on averaging a state's three highest payments between 1986 through 1999 to arrive at a compensation allotment or "full payment amount." Counties may choose to continue to receive payments under the 25 Percent Fund, or to receive the county's proportionate share of the state's full payment amount. For the purposes of this analysis it was assumed that 25 percent of all National Forest revenues would be returned to the local impact area, and that a split of 50 percent for schools and 50 percent for roads would represent how local governments spend these revenues. A profile of expenditures for each of these purposes was derived from the model itself. Details regarding the expenditures may be found in the project record

Use of the Model. The national expenditure profile for state/local government education (schools) and estimates for road construction (roads) are provided within IMPLAN. One million dollars of each profile was used to obtain an estimate a response coefficient for these Forest Service payments to the analysis area counties. The results were then incorporated into the FEAST where they were multiplied by total expenditures. Sales to local government are treated in the same manner as exports.

Output Levels

Output levels are specified in the FEAST Excel workbook, located in the project record.

Financial and Economic Efficiency Analysis

Fifty years were used for the planning horizon because of the varying time periods over which treatments occur in the plan decade and the forage response realized. It is expected that all forage responses from each treatment conducted in the first planning decade regime would be realized by year 50.

Primarily, vegetation treatments and acres proposed in each alternative were modeled. Riparian protection measures associated with Alternatives G and H were also included. All treatments were projected to occur within the 10-year plan period, though some first-decade treatments occurring over several years were not completed until into the second decade. Also, only treatments that materially affected grazing utilization and relative cost effectiveness were analyzed. Proposed tree row plantings or changes in travel management, for example, were not modeled for economic efficiency (See Project File).

Treatment regimes included the following:

- POBU –
 - burn (year 0), plow and lie fallow (year 1), crop (year 2), sow replacement species (year 3), rest (year 4), permit late season grazing (end of year 4). POBU plowing, tilling and the third year crop are done by non-FS third party at their own cost and benefit. The costs and benefits are not included in economic efficiency analysis.
 - brush beat with same follow-up regeneration regimen for 5 years.
- Non-POBU –
 - burn only, with understory release (generally non-native and native mixed species), rest for two growing seasons to allow establishment before grazing resumes.
 - apply herbicide to kill sagebrush and release the established understory (same species mix). No deferral of grazing during understory release.
- Species regenerated –
 - Native grass, forbs, and shrub species. Native seed mixes are more expensive, running \$74 per acre to sow.
 - Non-native introduced species, such as the wheat grasses (crested, intermediate, pubescent), etc. This seed mix is less expensive; about \$40 per acre.
 -

All alternatives were analyzed according to the vegetation management actions proposed in Chapter 2 of the EIS. Acres with changes in vegetation management were analyzed for changes in available head-months of grazing. Several estimates of forage response under three sagebrush cover classes (0%-5%, 6%-15%, and > 15%) were derived, with resultant potential head-months of grazing opportunity over a 30-year time frame (1st decade, 2nd decade, and 3rd decade). A mid-range of 1,500 lbs. per acre forage production for the 0%-5%, 825 lbs. per acre for 6%-15% class and 500 lbs. per acre for >15% class were used to determine benefits from grazing utilization (See Appendix G).

Based on District records, an administrative cost (\$0.42 per acre) for oversight of the grazing program on the modeled acres was applied. For consistency, a forage utilization benefit occurred on acres prior to treatment and this value captured in the benefits column. After treatment, the treatment regime scenario and subsequent forage response (and benefit) was modeled out to 30 years.

Ken Timothy, Westside District wildlife biologist in Malad, and other Forest Service sources, provided the forage production and cost estimates associated with modeled treatment scenarios. The chemical manufacturer provided Tebuthiron herbicide treatment costs per acre (\$20).

Alternative D, in which no grazing is permitted, yields no benefit stream from grazing and only an estimated \$0.10 custodial administrative cost was applied for the 30-year period. This cost reflected the relative change in management oversight proposed by Alternative D.

The timing and acres of proposed treatments by alternative could be portrayed in a myriad of scenarios within the 10-year plan period. However, alternatives were modeled to spread the proposed acres and treatments evenly over the decade. This eased model complexity without compromising the comparability of the results between alternatives.

Net Public Benefits. Net public benefits are the "overall long-term value, to the nation, of all outputs and positive effects (benefits) less all associated Forest inputs and negative effects (costs) whether they can be quantitatively valued or not" (36 CFR 219.3). Net public benefits represent the sum of the net value of priced outputs plus the net value of non-priced outputs.

Financial efficiency is defined as how well the dollars invested in each alternative produce revenues to the agency. Economic efficiency is defined as how well the dollars invested in each alternative produce benefits to society. Present Net Value (PNV) is used as an indicator of financial and economic efficiency.

Table B-4 highlights each activity included in the analysis, the unit of measure, and the economic and financial benefit of each. The economic benefit is an estimated market clearing price (what the resource would be priced at if available in the private sector) and consumer surplus (the estimated value a person has for a resource above the price actually paid). In this way, the PNV economic analysis attempts to account for the values people hold for forest resources, even though they may not have to pay for them. The financial value is a measure of the revenues actually received by the Forest Service for resource extraction, access, or use. As displayed in the following table, recreation activities tend to have low, or no revenues collected by the Forest Service while both grazing and wood products have associated fees. Although with the recreation fee program and increasing management of recreation sites by concessionaries, the revenues collected by the recreation program is likely to increase in the future. Costs associated with the PNV analysis are taken from the budget estimates for full implementation of each alternative.

Table B-4. Economic Benefits And Financial Revenue Values In 2000 Dollars

Activity	Unit	Economic Benefit	Financial Value
Camping, picnicking, swimming	RVD	\$5.62	0
Mechanized travel and viewing	RVD	\$7.92	0
Hiking, horseback riding & water sports	RVD	\$10.82	0
General hunting	RVD	\$39.93	0
General fishing	RVD	\$53.23	0
Non consumptive wildlife	RVD	\$54.35	0
Grazing cattle	AUM	\$6.27	\$1.35

Source: USDA Forest Service 1990. Curlew National Forest 2001. Quick Silver 2001.